Central Inverter

SUNNY CENTRAL 500-US

Maintenance Manual

SC500U-eng-WH-IUS115210 | 98-4107310 | Version 1.0

CA US

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the following products:

- Sunny Central 500U

This manual must be followed during installation and maintenance.

The product is designed and tested in accordance with international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating the product. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, you must carefully read and follow all instructions, cautions and warnings in this manual.

Warnings in this document

A warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the SMA equipment and/or other equipment connected to the SMA equipment or personal injury.

Symbol	Description
⚠ DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	NOTICE is used to address practices not related to personal injury.

Other symbols in this document

In addition to the safety and hazard symbols described on the previous pages, the following symbols are also used in this manual:

Symbol	Description
	Indicates information that is important for a specific topic or objective, but is not safety-relevant.
☐	Indicates a requirement for meeting a specific goal.
☑	Desired result
✖	A problem that could occur

Markings on this product

The following symbols are used as product markings with the following meanings:

Symbol	Description
	Warning regarding dangerous voltage The product works with high voltages. All work on the product must only be performed as described in the documentation of the product.
	Electric arc hazards The product has large electrical potential differences between its conductors. Arc flashes can occur through air when high-voltage current flows. Do not work on the product during operation.
	Beware of hot surface The product can become hot during operation. Do not touch the product during operation.
	Observe the operating instructions Read the documentation of the product before working on the product. Follow all safety precautions and instructions as described in the documentation.
c UL us	Evaluated to the requirements of the Underwriters Laboratories Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741. The inverter has been additionally evaluated by Underwriters Laboratories to CAN/CSA C22.2 No. 107.1-1, "General Use Power Supplies."

General Warnings

⚠ WARNING

General Warnings

All electrical installations must conform with the local and *National Electrical Code*® ANSI/NFPA 70 or the *Canadian Electrical Code*® CSA C22.1. This document does not and is not intended to replace any local, state, provincial, federal or national laws, regulations or codes applicable to the installation and use of the product, including without limitation applicable electrical safety codes. All installations must conform with the laws, regulations, codes and standards applicable in the jurisdiction of installation. SMA assumes no responsibility for the compliance or noncompliance with such laws or codes in connection with the installation of the product.

Before installing or using the product, read all of the instructions, cautions, and warnings in this manual.

Before connecting the product to the power distribution grid, contact the local utility company. This connection must be made only by qualified personnel.

Wiring of the product must be made by qualified personnel only.

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1 Information on this Document

This manual describes the service and maintenance of the Sunny Central 500U (500-US).

Validity

This manual is valid for the SC500U.

Target Group

This manual is intended for qualified skilled workers. Only skilled persons are allowed to perform any tasks set forth in this document (see Section 2.2 "Qualification of Skilled Persons", page 10).

Additional Information

Additional information is available at www.SMA-America.com:

Title	Document type
Installation requirements for Sunny Central 500U	Technical information
Installation Manual: Disconnect Unit	Installation manual

Nomenclature

In this manual, the Sunny Central 500U is also referred to as "Sunny Central" or the "inverter".

In this manual, SMA America Production, LLC and SMA Solar Technology Canada Inc. are hereinafter referred to jointly as SMA.

Abbreviations

Abbreviations	Designation	Explanation
AC	Alternating Current	–
DC	Direct Current	–
GFDI	Ground-Fault Detection Interruption	–
PE	Protective Earth	Protective conductor
PV	Photovoltaics	–

2 Safety

2.1 Intended Use

The Sunny Central is an inverter that changes direct current obtained from PV modules into alternating current when the DC input voltage is between 330 V and 600 V, and when the permissible ambient conditions are adhered to. The Sunny Central is suitable for operation in outdoor areas. The Sunny Central meets NEMA 3R protection class standards and can also be operated in rain, snow, and sleet.

Only persons fulfilling all of the skills for the target group may work on or with the Sunny Central.

Intended use also includes observance of the service and maintenance intervals specified in this document.

All work on the Sunny Central must be performed using the appropriate tools.

In order to ensure that the Sunny Central is used as intended, this documentation must be read and all safety precautions and messages must be duly noted and followed.

For safety reasons, it is forbidden to modify the product or install components that are not explicitly recommended for this product or distributed by SMA.

The Sunny Central must not be operated with its doors open.

The Sunny Central may not be opened when it is raining or when humidity exceeds 95%.

The Sunny Central may only be operated when it is in perfect working order. This must be ensured by observance of the service and maintenance intervals specified in this document. In addition, the maintenance work that has been performed must be documented by the customer in the maintenance report including photos.

Any use of the Sunny Central other than that described in this section is not regarded as intended use.

2.2 Qualification of Skilled Persons

A qualified person has been adequately trained and has demonstrated the ability and knowledge to operate and maintain the device. Qualified persons have been trained in how to deal with the dangers and risks associated with installing electrical installations as specified in 29 CFR, Chapter XVII, Part 1910 (OSHA), NEC, and NFPA 70E, and possess all the necessary knowledge for averting danger. There must be written documentation of their training.

2.3 Safety Precautions

This section contains safety precautions that must always be observed during work on or with the Sunny Central. To prevent personal injury and property damage and to ensure long-lasting operation of the Sunny Central, read this section carefully and follow the instructions.

Electrical Hazards

⚠ DANGER

Electric shock due to live voltage

High voltages are present on the inverter and its components. Some maintenance work must be carried out with voltage present. Failure to adhere to the safety messages may lead to severe or lethal injuries due to electric shock.

- Wear class 2 personal protective equipment.
- Always perform work in compliance with the regulations specified in 29 CFR, Chapter XVII, Part 1910 (OSHA), NEC and NFPA 70E.
- Do not touch any live components in the inverter or on the medium-voltage grid.
- Follow the instructions precisely.
- Observe safety messages.
- Before performing any work on the inverter, always disconnect the inverter if voltage is not absolutely necessary.
- After disconnecting the inverter, wait at least ten minutes until the inverter capacitors have discharged completely.
- Before performing work on the inverter, ensure that no voltage is present.

Electric shock caused by ground fault

If a ground fault has occurred, parts of the plant that are supposedly grounded may in fact be live. Failure to adhere to the safety messages may lead to severe or lethal injuries due to electric shock.

- Ensure that no voltage is present before touching any components.
- Wear class 2 personal protective equipment.

Electric shock due to damaged inverter

Operating a damaged inverter can lead to hazardous situations that result in serious injuries or death due to electric shock.

- Operate the inverter only if it is in safe and full working order.
- Operate the inverter only if there is no visible damage.
- Regularly check for visible damage.
- Make sure that all external safety equipment is freely accessible at all times.
- Make sure that all safety equipment is in good working order.

NOTICE

Damage to electronic components due to electrostatic discharge

Electrostatic discharge can damage or destroy electronic components.

- Observe the ESD safety regulations when working on the device
- Wear class 2 personal protective equipment.
- Neutralize any electrostatic charge before touching electronic components, for example, by touching the PE connection of the doors.

Environmental Hazards

⚠ WARNING

Danger to life due to blocked escape routes

In hazardous situations, blocked escape routes can lead to serious injury or death.

- An escape route at least 3 ft. (915 mm) wide must be available at all times.
- Do not place any objects in the escape route area.
- Remove all tripping hazards from the escape routes.

NOTICE

Damage to the inverter caused by dust or moisture penetration

Dust intrusion or moisture penetration can damage the inverter or impair its functionality.

- Do not open the inverter when it is raining or when humidity exceeds 95%.
- Only perform maintenance work on the inverter when the environment is dry and free of dust.

Mechanical Hazards

⚠ WARNING

Risk of fire due to failure to observe torque specifications

Failure to observe the torque specifications indicated in the installation manual reduces the ampacity of the screw connections. This can cause components to overheat and catch fire.

- Always use the torques specified in the installation manual.
- Regularly check that mounted components have always been set at the torque specified in the installation manual.

Thermal Hazards

⚠ CAUTION

Risk of burns due to hot components

The components of the inverter can get very hot. Touching these components can result in burns.

- Do not touch hot components.
- Wait until hot components have sufficiently cooled down.
- Observe safety messages in the inverter.
- Wear class 2 personal protective equipment.

2.4 Personal Protective Equipment

After the control voltage has been switched on, personal protective equipment is required for all work performed. The protective equipment must comply with the requirements of NFPA 70E. The customer must ensure that external measures limit incident energy levels to PPE level 2, in conformance with IEEE1584.

Any protective equipment mandated by law or otherwise required must be used as well.

3 Product Description

3.1 Setup

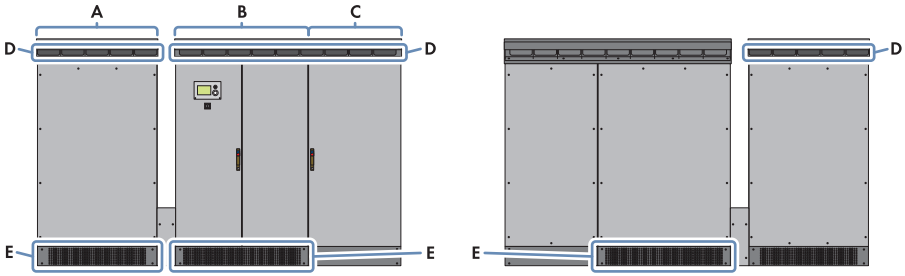


Figure 1: Design of the Inverter

Position	Description
A	Magnetics cabinet
B	Inverter cabinet
C	Interface cabinet
D	Insect screen
E	Ventilation grid

3.2 Control Elements

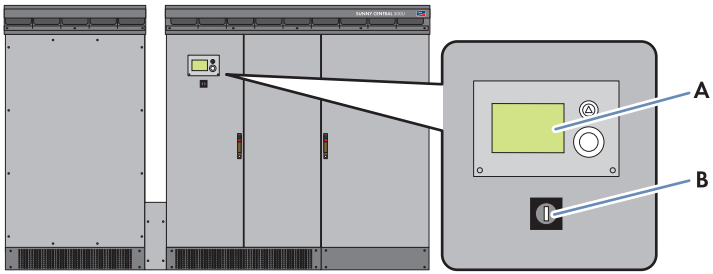


Figure 2: Display and key switch

Position	Description
A	Display
B	Key Switch

4 Maintenance

4.1 Maintenance Intervals

Observance of maintenance intervals ensures trouble-free operation of the Sunny Central. Maintenance intervals depend on ambient and operating conditions. Under especially harsh ambient conditions, certain maintenance tasks must be performed more frequently. These maintenance tasks are listed in the maintenance report. SMA recommends a monthly optical inspection in order to determine the need for maintenance.

Under normal ambient and operating conditions, the Sunny Central must be fully serviced at the following intervals:

Maintenance under normal ambient and operating conditions:

Description	Interval
Routine maintenance	Every 24 months
Retighten the power cable connection by using a cage clamp	Every 12 months
Unscheduled maintenance	After each AC short-circuit or in case of unusual events, such as smell, smoke or noise • Contact the SMA Service Line.

Preventive replacement intervals:

Description	Interval
GFDI / Soft Grounding / ABB High-Performance Circuit Breaker	After 100 trippings • Contact the SMA Service Line.
Fan	10 years • Contact the SMA Service Line.

4.2 Preparing for Maintenance

4.2.1 Identifying the Inverter

You can identify the inverter by its type label. You can find the type label on the bottom plate of the magnetics cabinet and on the inside of the inverter cabinet.

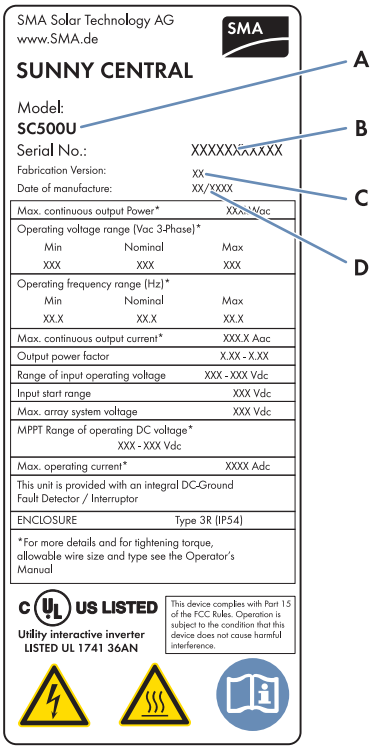


Figure 3: Type label (example)

Position	Description
A	Type designation
B	Serial Number
C	Fabrication version
D	Production date

4.2.2 Reading Error Messages

Before any maintenance you need to read pending error messages from the inverter. The error messages may give you clues about possible damaged components. The source of the error must be corrected before scheduled maintenance is started.

1. Read error messages via the display (see the Sunny Central user manual).
2. Fix the source of the error (see the Sunny Central user manual).
   ☑ There are no more error messages.

4.3 Maintenance under Voltage-free Conditions

4.3.1 Disconnecting the Inverter

⚠ DANGER

Danger to life due to electric shock
High voltages are present in the conductive components of the inverter

The inverter components are energized. Touching components in the inverter can result in severe injuries or death.

- Before performing any work on the Sunny Central, disconnect the inverter and secure it against reconnection.
- After disconnecting the inverter, wait at least ten minutes until the inverter capacitors have discharged completely.
- Ensure that no voltage is present.
- Wear class 2 personal protective equipment.
- Follow the instructions precisely.
- Observe safety messages.

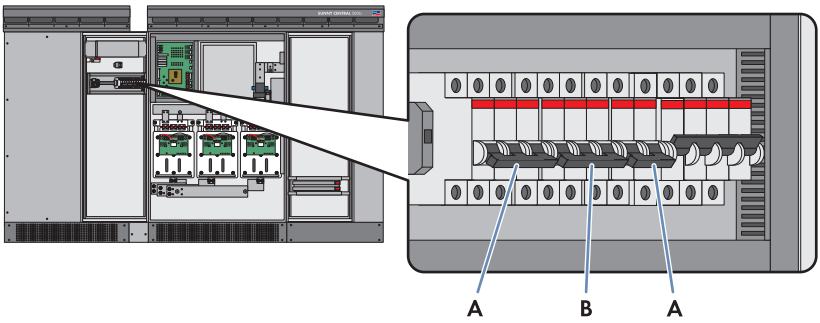
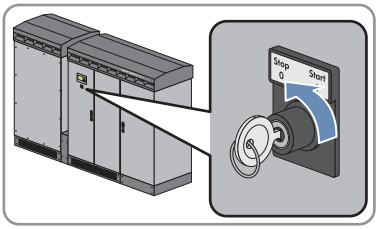


Figure 4: Miniature circuit-breaker for the control voltage and the voltage meter

Position	Description
A	Miniature circuit-breaker for the internal control voltage
B	Miniature circuit-breaker for the voltage meter

1. Set the key switch of the inverter to "Stop".



2. Check whether the DC and AC contactors audibly shut off within five seconds or less.

   If the DC and AC contactors do not audibly shut off within five seconds or less, contact the SMA Service Line.
3. Disconnect the inverter from the DC side of the PV array via the external DC disconnecting device and ensure that it cannot be reconnected.
4. When using the Disconnect Unit:
   - Disconnect the AC and DC sides using the Disconnect Unit's disconnect switch and ensure that it cannot be reconnected (see the Disconnect Unit installation manual).
5. Disconnect the AC voltage using an external AC disconnection and secure it against accidental re-connection.
6. In the case of additional external voltages:
   - Disconnect additional external voltages and secure them against accidental re-connection.
7. **⚠ DANGER**

   Danger to life due to electric shock High voltages are present in the conductive components of the inverter

   The inverter components are energized. Touching components in the inverter can result in severe injuries or death.
   - Wait at least ten minutes until the inverter capacitors have discharged completely.
8. Open the doors of the interface cabinet and the inverter cabinet.
9. Switch off the miniature circuit-breaker for the internal control voltage and secure it against being switched back on.
10. Switch off the miniature circuit-breaker for the voltage meter and secure it against being switched back on.
11. Ensure that all poles are free of voltage.
12. Ground and short-circuit the device.
13. Cover or safeguard any adjacent live components.
14. Close the doors of the interface cabinet and of the inverter cabinet.

4.3.2 Performing the Visual Inspection

A thorough visual inspection must be performed before any maintenance work. This ensures that inverter components are not damaged and also minimizes potentially hazardous situations.

Visual inspection means:

- Check the inverter for soiling.
- Check the inverter's enclosure for damage.
- Check components inside the inverter for damage and discoloration.
- Check the inverter for loose component parts.
- Check metal components for visible oxidation.
- Check components for soot from overheating.

1. Disconnect the inverter on the AC and DC sides (see Section 4.3.1 "Disconnecting the Inverter", page 17).
2. Fix any deficiencies discovered during the visual inspection.

4.3.3 Disassembling the Ventilation Grids

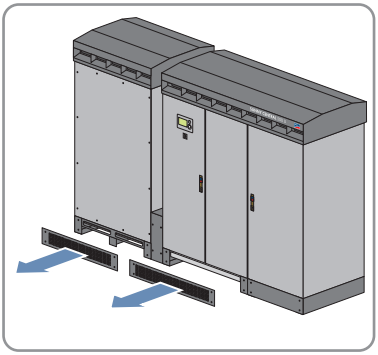
Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

Grounding cables on the ventilation grids

The ventilation grids are connected to the inverter via grounding cables.

1. Undo the screws on the two ventilation grids.
2. Pull the ventilation grids to the front.
3. Disconnect the PE connection from the ventilation grids.
4. Remove the ventilation grids.



4.3.4 Disassembling the Front Panel of the Magnetics Cabinet

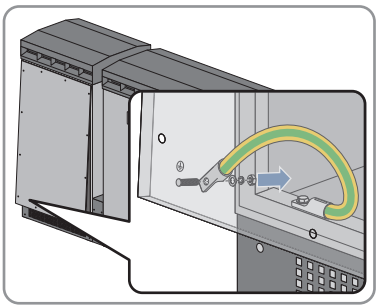
Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

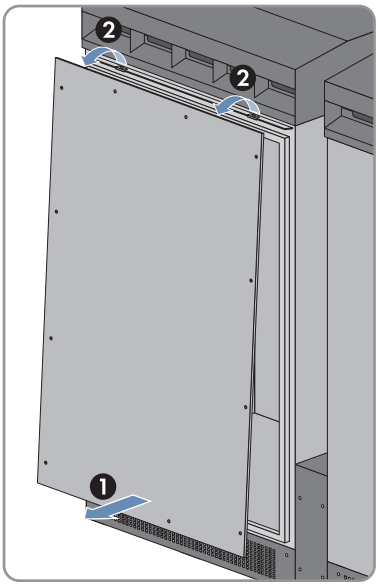
Grounding cable on the front panel of the magnetics cabinet

The front panel is connected to the magnetics cabinet via a grounding cable.

1. Undo the screws on the front panel of the magnetics cabinet.
2. Pull the front panel at the bottom to the front. Disconnect the PE connection between the front panel and the magnetics cabinet.



3. Remove the front panel. In doing so, pull the front panel to the front and lightly lift it up. The front panel is loosened from the anchoring.



4.3.5 Checking the Safety Messages

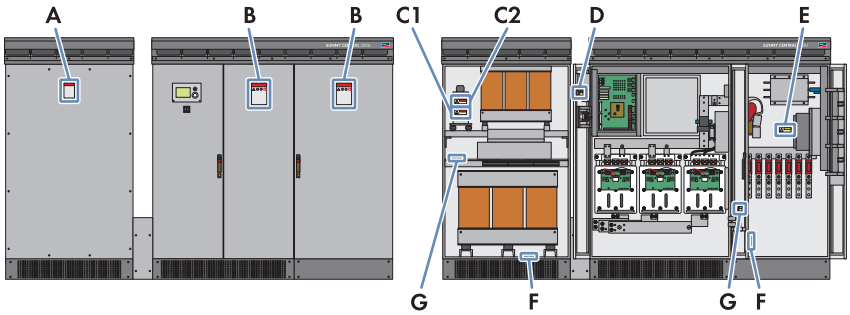


Figure 5: Position of safety messages

Position	Description
A	Hazardous voltage inside
B	Hazardous voltage inside. Shock and arc flash explosion hazard
C1	Hazardous voltage
C2	Risk of elektric shock or electrical energy – high current levels
D	Maximum ambient temperature
E	Burn hazard
F	Type label
G	Burn hazard

Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

Illegible or missing warning signs

There must always be legible warning signs present on the inverter.

- Regularly check to be sure that all warning signs are present and undamaged.
- Immediately replace missing, faded, or damaged warning signs.

- Replace missing or damaged safety messages and stickers. In the case of missing or damaged safety messages or stickers, contact the SMA Service Line.

4.3.6 Removing and Mounting the Condensate Drain

The condensate drains mounted in the inverter enable the drainage of moisture to the outside. The condensate drain in the inverter cabinet must be removed before removing and cleaning the ventilation plate.

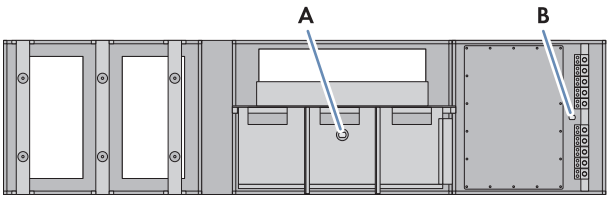
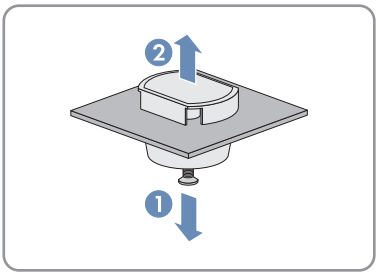


Figure 6: Positions of the condensate drains in the bottom of the inverter

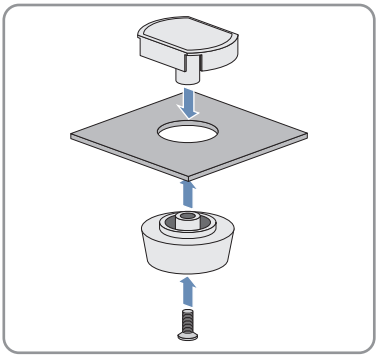
Position	Description
A	Condensate drain in the inverter cabinet
B	Condensate drain in the interface cabinet

Remove each condensate drain in accordance with the following procedure:

1. Unscrew the condensate drain from below and remove it.



2. If the condensate drain is soiled, clean it.
3. After mounting the ventilation plate, reinstall the condensate drain.



4.3.7 Cleaning the Ventilation Plate of the Inverter Cabinet

NOTICE

Impaired air circulation increases the internal temperature and can reduce the electrical endurance of temperature-sensitive components.

The cleaning interval for the ventilation plate depends on the ambient conditions.

- Clean the ventilation plate more frequently in cases where there is high sand or dust content in the air (see maintenance report).

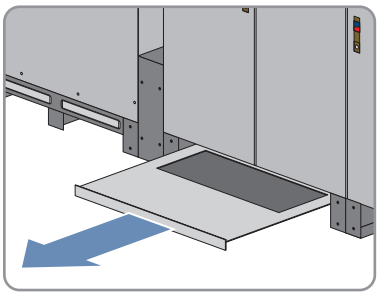
Requirements:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

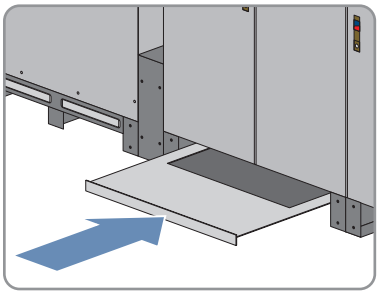
☐ The ventilation grids must be removed (see Section 4.3.3 "Disassembling the Ventilation Grids", page 19).

☐ The condensate drain must be removed (see Section 4.3.6 "Removing and Mounting the Condensate Drain", page 22).

1. Remove the ventilation plate from the inverter cabinet. To do this, grasp under the ventilation plate and press upwards in the middle when removing.



2. Clean the ventilation plate using a brush and vacuum.
3. Push the ventilation plate into the inverter cabinet. The ventilation plate must face the back panel.



☑ The ventilation plate is flush with the inverter enclosure.

✖ The ventilation plate does not go all the way in?

- Grasp the ventilation plate from underneath and press upwards in the middle while pushing it in.

4.3.8 Cleaning the Ventilation Plates of the Magnetics Cabinet

NOTICE

Impaired air circulation increases the internal temperature and can reduce the electrical endurance of temperature-sensitive components.

The cleaning interval for the ventilation plates depends on the ambient conditions.

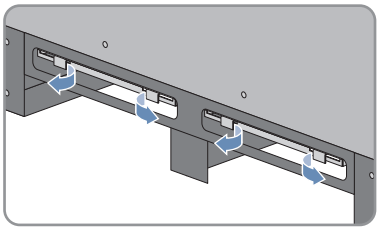
- Clean the ventilation plate more frequently in cases where there is high sand or dust content in the air (see maintenance report).

Requirements:

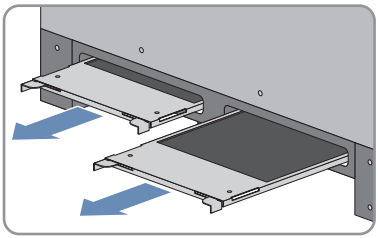
☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

☐ The ventilation grids must be removed (see Section 4.3.3 "Disassembling the Ventilation Grids", page 19).

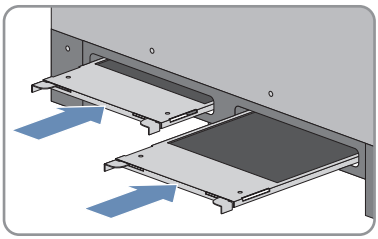
1. Flip the flaps of the ventilation plates to the side.



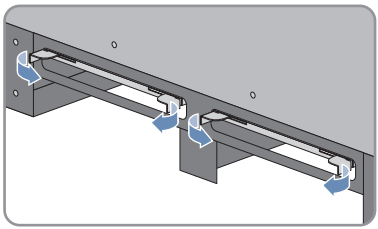
2. Remove the ventilation plates from the magnetics cabinet. To do this, grasp under the ventilation plate and press upwards in the middle when removing.



3. Clean the ventilation plates using a brush and vacuum.
4. Push the ventilation plates into the magnetics cabinet.
   ☑ The ventilation plates are positioned flush with the enclosure of the magnetics cabinet.
   ✖ The ventilation plates get stuck when sliding them in?
   - Grasp the ventilation plates from underneath and press upwards in the middle while pushing.



5. Fold the flaps of the ventilation plates to the inside.



4.3.9 Cleaning the Ventilation Grids

NOTICE

Impaired air circulation increases the internal temperature and can reduce the electrical endurance of temperature-sensitive components.

The cleaning interval for the ventilation grids depends on the ambient conditions.

- Clean the ventilation grids more frequently in cases where there is high sand or dust content in the air (see maintenance report).

Requirements:

☐ The inverter is disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

☐ The ventilation grids are removed (see Section 4.3.3 "Disassembling the Ventilation Grids", page 19).

1. Clean the ventilation grids using a brush.
2. Vacuum the ventilation grids.
3. Check the ventilation grids for visible damage.
   ☑ The ventilation grids are not damaged.
   ✖ The ventilation grids are damaged?
   - Replace damaged ventilation grids.
4. Mount the ventilation grids.

4.3.10 Cleaning the Air Duct and Insect Screens

NOTICE

Impaired air circulation increases the internal temperature and can reduce the electrical endurance of temperature-sensitive components.

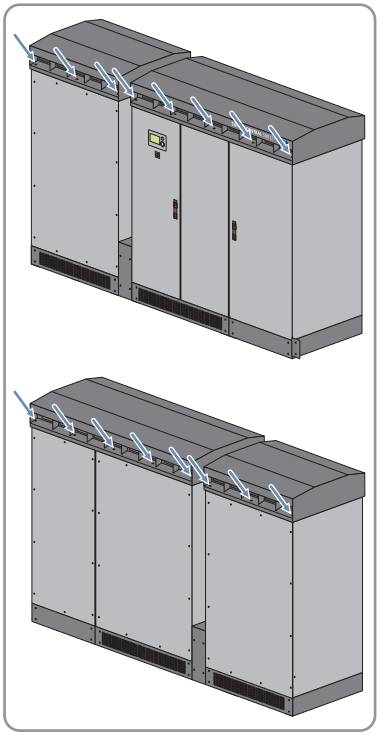
The cleaning interval for the air duct and insect screen depends on the ambient conditions.

- Clean the air duct and insect screen more frequently in cases where there is high sand or dust content in the air (see maintenance report).

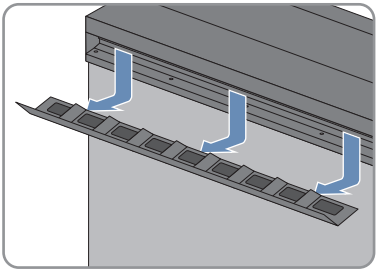
Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

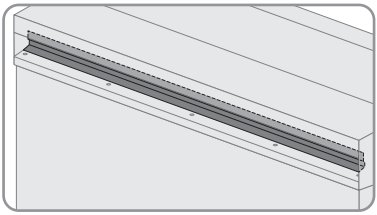
1. Undo the screws on the insect screen.



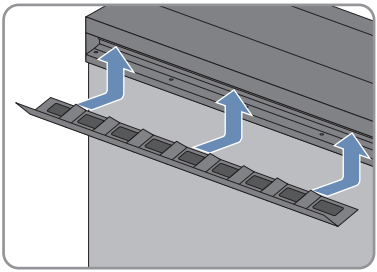
2. Pull the bottom of the insect screen to the front. This removes the insect screen.



3. Clean the air duct from the outside.



4. Clean the insect screens using a brush.
5. Vacuum the insect screens.
6. Check the insect screens for visible damage.
   ☑ Insect screens are not damaged.
   ✖ Are the insect screens damaged?
   - Replace damaged insect screens.
7. Insert the insect screens.



8. Screw the insect screens into place. Torque 177 in.-lbs. (20 Nm).

4.3.11 Cleaning the Inside of the Switch Cabinet

The switch cabinets of the magnetics cabinet, the inverter cabinet and the interface cabinet must be cleaned during maintenance.

Requirements:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

☐ The front panel of the magnetics cabinet must be disassembled (see Section 4.3.4 "Disassembling the Front Panel of the Magnetics Cabinet", page 20).

1. Remove dirt and dust from the interior of the switch cabinet (e.g. DC contactor and AC circuit breaker). Electrical components must not be cleaned (e.g. printed circuit boards).
2. Remove moisture.
3. Check for leaks. Correct as necessary.
4. If the maintenance is interrupted at this point, mount the front panel on the magnetics cabinet (see Section 5.2 "Mounting the Front Panel of the Magnetics Cabinet", page 39).

4.3.12 Checking the DC Main Fuses

NOTICE

Damage to screw connections from over-tightening

- Only tighten loose screw connections applying the prescribed torque. Torque specifications are shown in the circuit diagram of the inverter. Contact the SMA Service Line if specifications are missing.

Requirement:

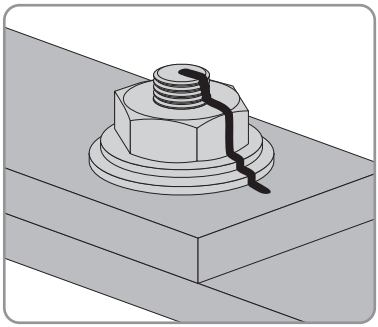
☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

1. Open the doors of the interface cabinet.
2. Remove the acrylic covers.
3. Check fuses, terminals, and insulation for discoloration or changes. When checking, do not remove the fuses.

   If the fuses, terminals, or insulation are discolored or changed, contact the SMA Service Line.

4. Check whether the mark on the screw connections of the fuses is in the right place.

   If the mark on the screw connections is not in the right place, retighten the screw connection (see the inverter's circuit diagram for the torque specification). Contact the SMA Service Line in the event of damage or changes.



5. Check whether discolorations can be seen on the screw connections of the fuses.

   If discolorations can be seen on the screw connections, contact the SMA Service Line.

6. Mount the acrylic covers.
7. Close the doors of the interface cabinet.

4.3.13 Checking the Connection of Power Cables Using Terminal Lugs (Optional)

NOTICE

Damage to screw connections from over-tightening

- Only tighten loose screw connections applying the prescribed torque. Torque specifications are shown in the installation manual of the inverter. Contact the SMA Service Line if specifications are missing.

Requirements:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

☐ The front panel of the magnetics cabinet must be disassembled (see Section 4.3.4 "Disassembling the Front Panel of the Magnetics Cabinet", page 20).

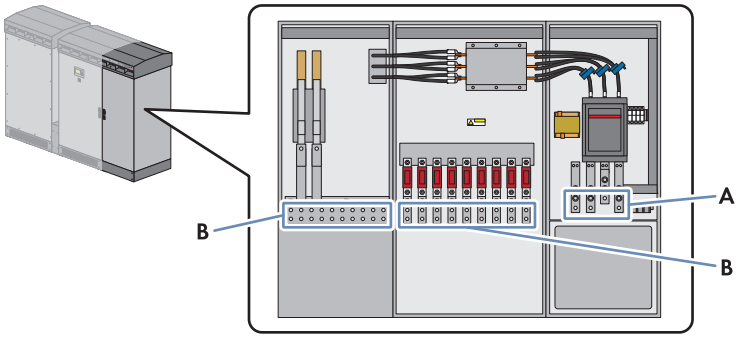


Figure 7: Overview of the screw connection of the interface cabinet

Position	Description
A	AC connection
B	DC connection

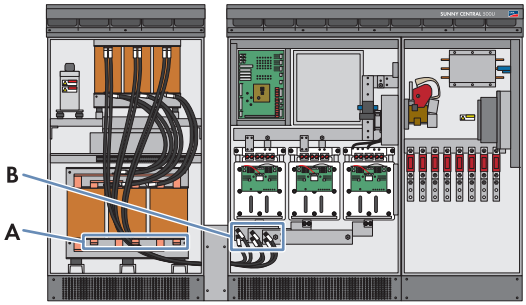


Figure 8: Overview of the screw connection of the power cabling in the magnetics cabinet and the inverter cabinet

Position	Description
A	Connection of the transformer
B	Termination points on the inverter bridge

1. Check whether all screw connections for the power cables are tight.

   If screw connections are loose, tighten them with a torque wrench.
2. Check insulation and connections for discoloration and changed appearance.

   If insulation and connections are discolored or changed, contact the SMA Service Line.
3. Check screw connections for damage and contact elements for corrosion.

   If screw connections are damaged or contact elements are corroded, contact the SMA Service Line.
4. Mount the front panel of the magnetics cabinet (see Section 5.2 "Mounting the Front Panel of the Magnetics Cabinet", page 39).

4.3.14 Retightening the Connection of the Power Cables Using Cage Clamps (Optional)

NOTICE

Damage to screw connections from over-tightening

- Only apply the prescribed torque to tighten screw connections with the cage clamp option. Torque specifications are shown in the inverter installation manual. Contact the SMA Service Line if specifications are missing.

NOTICE

Inadequate screw connections due to harsh ambient conditions

- Check the screw connections for discoloration or changes more frequently in the case of significant daytime temperature differences (see maintenance report).

Requirements:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

☐ The front panel of the magnetics cabinet must be disassembled (see Section 4.3.4 "Disassembling the Front Panel of the Magnetics Cabinet", page 20).

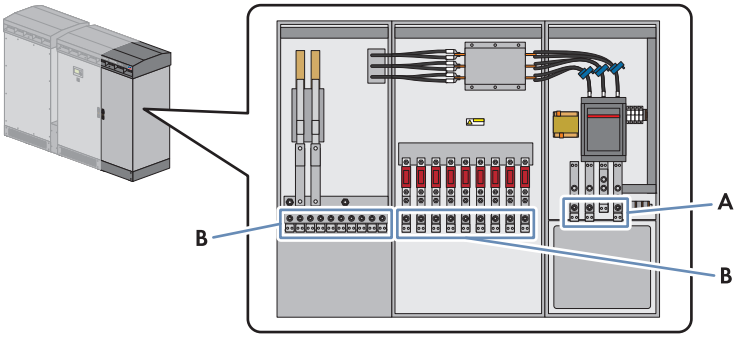


Figure 9: Overview of the screw connection of the interface cabinet

Position	Description
A	AC connection
B	DC connection

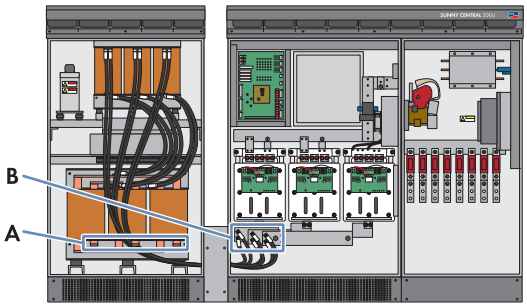
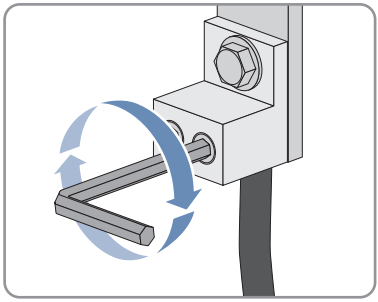


Figure 10: Overview of the screw connection of the power cabling in the magnetics cabinet and the inverter cabinet

Position	Description
A	Connection of the transformer
B	Termination points on the inverter bridge

1. Disassemble the protective covers.
2. Tighten the screw connections with cage clamps using a torque wrench. Torque 42 ft.-lbs. (57 Nm).



3. Check insulation and connections for discoloration and changed appearance.

   If insulation and connections are discolored or changed, contact the SMA Service Line.
4. Check screw connections for damage and contact elements for corrosion.

   If screw connections are damaged or contact elements are corroded, contact the SMA Service Line.
5. Mount the protective covers.

4.3.15 Checking the Door Seals

There are seals on the doors of the switch cabinets and at the front panel of the magnetics cabinet.

Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

Additional maintenance material that is required but not included in the delivery:

☐ To lubricate, use a suitable water-free, heat-resistant lubricant.

1. Check whether the seals in the sealing area show any damage. Tip: The sealing area must be hidden when the door is closed.

   If seals are damaged, contact the SMA Service Line.
2. Maintain seals with talcum, petroleum jelly or wax. This prevents frost damage.
3. If the side panels are disassembled: Check whether the seals in the side panels show any damage in the sealing area.

   If seals are damaged, contact the SMA Service Line.

4.3.16 Checking the Locking Devices and Hinges

Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

Additional maintenance material that is required but not included in the delivery:

☐ A suitable water-free, heat-resistant lubricant, e.g. WD40.

1. Check whether the latching action is smooth. Open and shut the doors several times in the process.
   If the doors do not latch easily, lubricate all moving parts of the latch.
2. Check whether the doors can be held in place.
   If the doors cannot be held in place, lubricate the door stops.
3. Check whether the door hinges move easily.
   If the door hinges do not move easily, lubricate them.
4. Lubricate all moving latch elements and movement points.

4.3.17 Checking the Surface of the Switch Cabinet

Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

1. Clean the outside walls of the inverter.
2. Check surfaces for damage or corrosion.
   If surfaces are damaged, repair them.
   If surfaces show corrosion, remove the corrosion.

4.3.18 Checking the Switch Cabinet for Corrosion

Requirement:

☐ The inverter has to be disconnected (see Section 4.3.1 "Disconnecting the Inverter", page 17).

Additional maintenance material that is required but not included in the delivery:

☐ To seal small areas, use touch-up sticks, paint brushes or spray paint cans or alternatively 2K-PUR acrylic paint. Observe the manufacturer specifications of the touch-up paints. Touch-up paint can be ordered via the SMA Service Line.

Position	Color	Article number
Cabinet surfaces	RAL 7045	87-5051314
Roof and base panel elements	RAL 7024	87-5051313

☐ To repair larger surfaces, use touch-up paint or, alternatively, 2K-PUR acrylic paint. Observe the manufacturer specifications of the touch-up paints.

☐ Abrasive cloth

☐ Degreaser

1. Remove dirt.
2. To remove small-area surface damage:
   - Abrade the surface.
   - Clean the surface with a degreaser.
   - Paint the surface.
3. To remove large-area surface damage:
   - Abrade the surface.
   - Clean the surface with a degreaser.
   - Paint the entire surface.

4.4 Performing Maintenance Work on Inverters with Activated Control Voltage

4.4.1 Connecting the Control Voltage

⚠ DANGER

Danger to life due to electric shock
High voltages are present in the conductive components of the inverter

High voltages are present on the inverter and its components. Failure to heed this safety message can result in severe or lethal injuries due to electric shock.

- Wear class 2 personal protective equipment.
- Follow the instructions precisely.
- Observe safety messages.

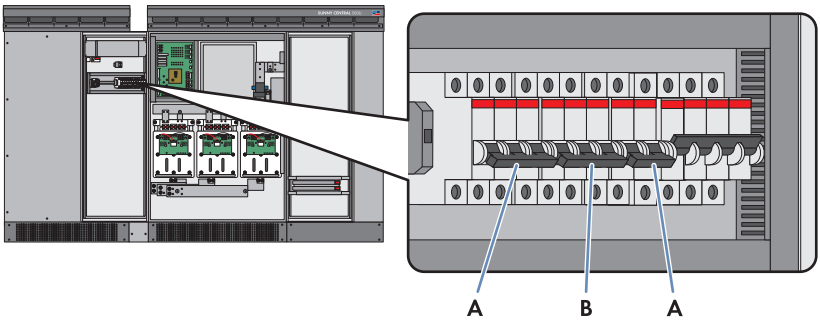


Figure 11: Miniature circuit-breaker for the control voltage and the voltage meter

Position	Description
A	Miniature circuit-breaker for the internal control voltage
B	Miniature circuit-breaker for the voltage meter

1. Open the doors of the inverter cabinet.
2. Switch on the miniature circuit-breaker for the internal control voltage.
3. Switch on the miniature circuit-breaker for the voltage meter.
4. Close the doors of the inverter cabinet.

4.4.2 Checking Heating Elements, Fans and Hygrostat

⚠ CAUTION

Risk of burns due to hot surfaces of the heating

During the functional test, the heating element becomes hot. There is a risk of burns if you touch the heating without protective gloves.

- Do not touch heating elements with bare hands.
- Wear class 2 personal protective equipment.
- Always maintain a suitable distance when checking the function of the heating elements.

Low humidity

If the humidity is below 50%, you will not be able to perform the function test since the minimum value of the hygrostat is 50%.

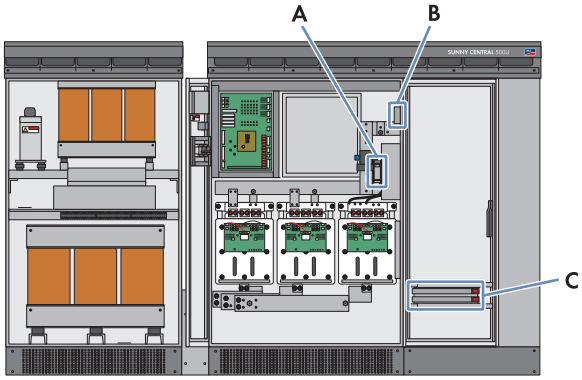


Figure 12: Positions of heating elements, hygrostat and fans

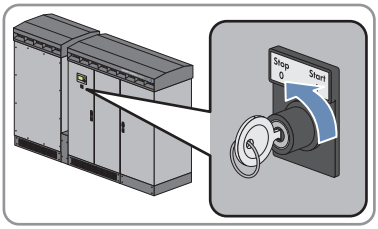
Position	Description
A	Fan
B	Hygrostat
C	Heating element

Requirements:

☐ Control voltage must be present.

☐ There must be no disturbances here.

1. Switch the inverter to "Stop".

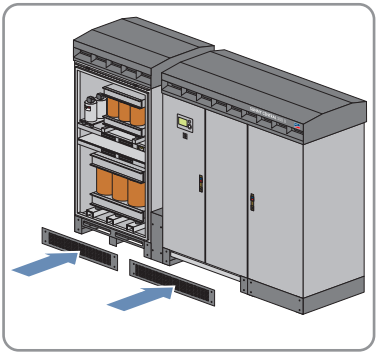


2. Open the doors of the inverter cabinet.
3. Set the hygrostat in the inverter cabinet low enough that the heating element switches on.
4. Check whether the heating element begins to radiate heat after approximately five minutes.
   If the heating element does not switch on , contact the SMA Service Line.
5. Check whether the fan starts to run.
   If the fan does not start running, contact the SMA Service Line.
6. Turn the hygrostat in the inverter cabinet back to its initial position. TIP: the hygrostat is set correctly when the white bar on the hygrostat's regulator is horizontal.
7. Close the doors of the inverter cabinet.

5 Restarting the System

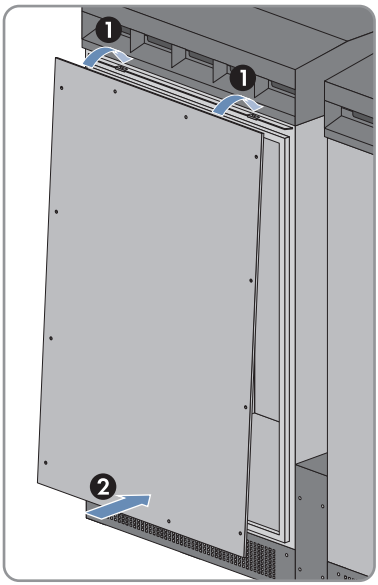
5.1 Mounting the Ventilation Grid

1. Make sure that no animals have entered the cabinet area.
2. Screw the grounding cables to the ventilation grids. Torque 71 in.-lbs. (8 Nm).
3. Mount the ventilation grids.



5.2 Mounting the Front Panel of the Magnetics Cabinet

1. Make sure that no animals have entered the cabinet area.
2. Position the front panel at an angle and hang it in the anchoring.



3. Fasten the PE connection to the front panel. Torque: 71 in.-lbs. (8 Nm)
4. Tighten the front panel on the magnetics cabinet. Torque: 53.5 in.-lbs. (6 Nm).

5.3 Recommissioning the Inverter

- Commission the inverter (see inverter installation manual).

6 Contact

If you encounter technical problems with our products, contact the SMA Service Line. We require the following information in order to provide you with the necessary assistance:

- Device type
- Serial Number
- Fabrication version
- Installation address with GPS coordinates
- Plant name
- Photos of defective components
- Type and number of connected PV modules

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